STUDY OF SOME CORRELATES OF THE QUALITY OF EDUCATION AT HIGHER SECONDARY LEVEL AS REVEALED BY PUPILS SCHOLASTIC ACHIEVEMENT IN THE SCHOOL FINAL EXAMINATION

BY
M. L. GUPTA

ADVISORY COMMITTEE

DR. R. C. SHARMA (ADVISOR)
MR. H. N. PANDIT (MEMBER)
MR. RAMESH CHANDRA SAXENA (MEMBER)

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
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CHAPTER I

INTRODUCTION

The greatest economic resource of any country is its people. No investment will be more rewarding than investment in improving the capacity of the people which indirectly implies in the improvement of quality of education.

From the writings of Schultz, Denison and others, it can be stated that less than one-third of the increase in national income of countries can be explained by quantitative inputs of the factors of production such as capital and labour. The difference~~s~~ is explained by qualitative improvement in the inputs — technology, more productive capital, and more productive human resources, in addition to other factors. The most important element seems to be upgrading of human resources through education and training as well as the growth of knowledge and technology available.

For improvement of quality of education, more demands are male on human effort and inganuity than on physical or material resources.

Fundamentally, the quality of education depends on teachers. To get teachers of high quality and motivate them properly needs more money no doubt, but cannot be done by money alone. Qualitative education also depends upon such programmes as improvement of curricula and text-books, adoption of modern methods of teaching and evaluation, improvement of supervision and creation of a climate of dedication of hard work. These programmes need human effort

rather than monetary investment.

Rich countries sometimes try to make up for the shortages of intellectual inputs by investing larger amounts of money. But a poor country like India cannot afford this luxury. It will have to make up for the shortages of physical and monetary investments by larger inputs of human effort.

The improvement in the quality of education means taking action to ensure that the requirements of the society and of its individuals will be met effectively.

[1]'The major problems in education, as in industry, are to specify the characteristics of product which are required, then to define the variables which must be controlled in order to obtain these characteristics. (Curriculum, Organisational pattern, Teaching skill and methods, building, equipment, etc.). Further it is desired to determine acceptable standards both for the products and the process; to identify and define a series of measurable practices which will be indicative of the performance of process and products in relation to their standards and finally make subjective judgement based on these measurements.

This immediately raises the question of variables of analytic relevance. What aspect of the school system, in the widest sense are susceptible to quality control techniques.'

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[1] Philip Hugh, The Evaluation of Quality in Education (International Institute for Educational Planning) Paper read for Symposium on the Qualitative aspect of Educational Planning, June, 1966.

The Education Commission Report 1964-66 suggested the following measures for quality improvement of education: (1) Greater competence of the teaching staff of all levels; (2) Better textbooks and instructional aids, all aimed at achieving the new direction of education; (3) Research of quality and increasing dependence upon the use of research and the development of experimental attitudes; (4) Creative teaching with freedom for teachers to grow and the use their initiative; (5) The development of democratic leadership to replace authoritarian attitudes, dependence, and practice; (6) Improved relations between students and teachers with opportunities for mutual examination and discussion of conflicting ideas and divergent opinions; (7) The extension of advance study centres and the development of major universities to incorporate into groups outstanding achievement and excellence; (8) Improvement in the school programme to eliminate wastage, and in the examination system to serve more adequately the need for measuring student performance; (9) The building of more effective administrative machinery, and increase in financial resources for libraries, laboratories, salaries, and all the other elements of an educational programme which can be improved through materials and administration.

In the present study some of the variables affecting quality in school education will be identified, conceptualised, described and measured in different areas of educational inputs i.e. teachers characteristics (in terms of qualification, experience and salary), size of school, teacher-pupil ratio, type of building and science laboratory equipment.

CHAPTER - II

THE PROBLEM

The major objective of the study was to identify the correlates of the quality of education.

The following Null hypotheses were tested:

1. Higher Secondary Schools, under the supervision and administration of Delhi Administration and following the same curriculum do not differ in per pupil cost.

2. There is no correlation between teachers' qualifications and quality of education.

3. There is no correlation between teachers' experience and quality of education.

4. There is no correlation between size of the school and quality of education.

5. There is no correlation between teacher-pupil ratio and quality of education.

6. There is no correlation between teachers' salary and quality of education.

7. There is no correlation between type of building and quality of education.

8. There is no correlation between science laboratory equipment and quality of education.

The Need of the Study

The greatest economic resource of any country is its people. No investment will be more rewarding than investment in improving the capacities of the people which indirectly

implies in the improvement of quality of education.

In India, during the last three plans, stress was laid on the quantitative expansion of education. Programmes of qualitative improvement received a low order of priority and a small allocation of funds. At present, schools have very little more than a teacher. No instruction worth the name is possible without essential amenties like buildings, furniture and equipment. If the quantitative expansion is continued in this manner, the result is bound to be disastrous after some time. In the Fourth Plan, the main stress would be laid on the qualitative improvement of education. It becomes imperative to know the correlates which determine the quality of education. In fact, very little research work in this direction has been done in India. Most of the ideas for qualitative improvement of education have been imported without knowing how far they are practical in Indian climate. What is desired is that concentrated efforts may be made by a band of enthusiastic research workers to make the best use of present physical and human resources for identifying the factors which are most important for qualitative improvement of education.

Scope and Delimitations of the Problem

1. The study was confined to the twenty schools of the South Delhi Zone.

2. The study was confined to Govt. Boys Higher Secondary Schools only.

3. The study related to the year 1966-67.

4. The quality index was the mean school achievement of the Higher Secondary final examination of the year 1967

conducted by the Central Board of Secondary Education.

5. The independent variables studied were: (a) Teachers' qualifications, (b) Teachers' experience, (c) Teachers' salaries, (d) size of the school, (e) teacher-pupil ratio, (f) type of school building, and (g) type of science laboratory equipment.

CHAPTER - III

DILEMMA OF QUALITY OF SCHOOL EDUCATION

There are almost as many definitions of quality in education as there are persons discussing the problem. It is a vague word in education and embraces several characteristics. It lacks a common frame of reference.

[1]One definition of quality lays greater emphasis upon high level of education and pays particular attention to difficult and advanced work. A second definition would put the major emphasis upon doing whatever the schools needed to do, with emphasis on doing it very well. A third stresses that high quality education deals with fundamental aims ~~and~~ and destiny of man only. The fourth definition emphasises that quality is in accomplishing whatever worthwhile ends one wants from education at a high level of efficiency. Accordingly, this definition of quality will tend to put emphasis on doing whatever the school should do in the shortest possible time and at the highest possible level. Besides these, there are several other definitions of quality which differ from one another either in the degree of emphasis they place upon the individual versus societal goods of education, or in the priority they assign to cognitive versus affective or psychomotor aspects of learning. In general, there seems to be relatively greater consensus in the examination results

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1. Clark, Harold F. Cost and Quality in Public Education Syracuse University Press, 1963, p.2-3.

Achievement of quality in education emphasises that the content and skills or abilities would be learned rapidly and pushed to a very high level for as many people as possible. The basic assumptions at the back of this are that a high quality school will provide for learning all the basic subjects and pursuing them to a high level of competence for a large number of people, with the most efficient use of resources. Whatever additional educational objectives are added, they would also be carried out to as high level as possible with the given use of time and material resources. This is very close to saying that a high quality school is one that gets a large output for a given input.

[2]At the simplest level, quality is what might be termed the classroom conception of quality; quality as seen by an inspector of schools. This obviously embraces such measurable skills as ability in the 3 R's, and the acquisition of a given range of facts about history, geography, hygiene and the like. Less measurable but equally accepetable are habits of industry, tidiness and accuracy, and attitudes of respect for authority and love for country. One index of school's success in achieving some of these humble but necessary ends is the speed at which pupils pass through the grades and the number to achieve the final certificate, particularly if this is awarded as a result of an external test.

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[2] Beeby, C.E. The Quality of Education in Developing Countries Harvard University Press, Cambridge, Massachussetts, 1966. pp.10-12.

At a more sophisticated level, is education still good if it fails to serve the economic goals of the community? It takes us clearly outside the classroom into the market place, where the quality of education is measured by its productivity. Some have sought this in comparison of the life time earnings of men and women with different grades of types of education; others have tried to estimate the contributions of education to the gross national product. The attempts to measure the quality of education by the rate of return for the money spent on it have not been markedly successful as yet, but the main concern at the moment is that there may be considerable discrepencies between the school master's and economist's judgment of the quality of school system.

Sometimes quality in education is judged by broader social criteria.

It is only at the class room level that the greatest measure of agreement on quality is found and with which we are mainly concerned in the present investigation.

Having defined quality, it is to be seen how far it is possible to find out the relationship between quality and its correlates which is one of the most challenging, important, and difficult phases of research in school finance. The major hurdles include formulating criteria of quality, devising means for describing or quantifying quality, controlling factors other than schooling which might affect the quality of measures. Further it becomes difficult to obtain uniform and complete expenditure data.

Among the various correlates, cost is one of the most important factors determining the quality of education. It may also be stated that not a single factor other than cost determines more than third of the quality of school level.

The importance of cost and quality relationship is voiced in the report of the Education Commission 1964-66: "...... Among other things, there is urgent need to examine continually the relationship between cost and quality and to develop programmes which would obtain the highest possible quality for a given level of input (or minimise inputs for a given level of quality)."[3]

It is observed that progress in the study of cost-quality relationships has been at a painfully slow rate.

[4]Cost-quality analysis brings to mind other terms such as operations research, optimisation, efficiency, and systems analysis. There are those who object to the application of such concepts to the analysis of educational institutions because their principle objectives are of a social nature, not economic.

Professor Alan Thomas has responded nicely to these objections by saying: "These reservations result from the problems which are involved in applying to one field of endeavour (in this case education), methods of analysis which

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3. Report of the Education Commission 1964-66, Ministry of Education, Government of India, New Delhi, p.487.
4. Swanson, Austin, D. The Cost-Quality Relationship. Paper read in the Committee on Educational Finance of the National Education Association, April 4, 1967.

were developed for a different purpose. Certainly, the method of applying the concept must vary according to the nature of the problems which are being examined. Yet the pursuit of efficiency, or the effort to reach a set of objectives at the lowest possible cost, is characteristic of most of man's endeavour."[5]

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[5] Thomas, J.A. Efficiency Criteria in Urban Schools Unpublished paper read at the 1967 Convention of the American Education Research Association, New York,

CHAPTER IV

REVIEW OF STUDIES OF CORRELATES OF QUALITY OF EDUCATION

In order to develop a conceptual framework within which the various correlates affecting the quality of school education are to be studied, it becomes imperative to review some of the researches which have been done in this direction for the last fifty years. Major emphasis in these researches have been laid on cost-quality relationship.

[6]Ayers in 1920 pioneered in attempting to relate public school expenditures to school quality. He found that there was real relationship between expenditure and results in education. It could not be proved that the higher paid teacher was individually more skilled than the lower paid one, but it could be shown that as salaries increased, attendance improved and more pupils were found in high schools. It could be further shown that as salaries increased, expenditures for purposes other than salaries also increased and this resulted in better building and equipment.

[7]Ferell in 1937 found a strong relationship between expenditure level and quality when quality was conceptualised as the attracting and holding power of the school, the training and experience of teachers, the teacher-pupil ratio and the length of the school term.

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6. Ayres, Leonard P. An Index for State School Systems, Russell Sage Foundation, New York, 1920.
7. Ferell, D.T. Relation between Current Expenditures and Certain Measures of Educational Efficiency in Kentucky County and Graded School Systems, George Peabody College for Teachers, Contributions to Education, N.216 Richmond, 1937, p.114.

Grace and Moe, Grimm and Powell made independent attacks upon the same problem. Since 1952, significant contributions to thinking on the type of study were made by the Committee on Text Education and School Finance of the NEA and by McLure. Bloom's study provides data on the relationship of school expenditure to educational achievement among States.

[8]A review of 26 odd studies on cost and quality relationships brought forth that 64 per cent rated school systems on what were considered good indications of what makes for good education. The items used ranged from short lists of external factors such as length and holding power to long lists of items descriptive of what is taught and how it is taught. Twenty per cent used tests of achievement and the remaining 16 per cent used social and economic characteristics of the population with expenditure levels of some year or years in the past.

Most of the studies that used descriptions of school practice were associated with Finance Surveys. Their purpose was to identify the educational programmes that were associated with different expenditure levels.

The study of the cost-quality relationships was incidental. But these studies do have the advantage of a range of evaluation which cannot be approached by testing the product.

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8. Mort, Paul R., Reussor Walt C., Polley John W. Public School Finance - its Background, Structure and Operation, Mcgraw Hill Co. Inc., New York, 3rd Edition, 1960, p.80-82.
(A list of review of 26 studies done is given at Annexure II)

Three pertinent statements will serve to summarise the finds of the 26 studies:

1. Regardless of the method of measuring quality, a relative strong relationship holds through all levels of expenditure.

2. Even the highest expenditure public schools do not begin to approach the point, if there is one) where the relationsh drops off, and no school is so poorly supported as to be lacking i important values.

3. The relationships appear to be accelerating one. Those who spend more tend to add to the range of education, on the one hand, and on the other, to do a better job of focussing on the needs of the children and young people throughout the range of ability.

. . [9]Woollatt obtained the quality measure by an application of the observation instrument, "The Growing Edge". This is an instrument designed to show the relative responsiveness of communities what are considered better methods of teaching and of operating schools. The instrument is limited and four facets that seem to be observed in high expenditure schools. (1) The teaching of skills in real or realistic fashion and the teaching of wider range of skills. (2) The teaching of areas of knowledge realistically. (3) The discovery and development of special aptitudes of individual through test and try-outs.

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[9] Lorne, H. Woollatt, *The Cost- Quality Relationship on the Growing Edge*, Bureau of Publications, Teachers' College, Columbia University, New York, 1949.

(4) The development of gross behaviour patterns, like citizenship, character, and thinking which seem to be developmental characteristics.

Woollatt's study showed that, within this group of high expenditure schools, there is a direct relationship between these factors taken together and expenditure and between each one individually and expenditure. The correlation between the overall score and the expenditure level was .59.

[10]Swanson developed a input-output Model of cost-quality relationship. The input variables are of two kinds: those which may be controlled by the organisation (Decision Variables) and those which are beyond the control of the organisation (Environmental Determinants). Input variables pass through a process of "Interaction" where some sort of end product "output". results. The non-controllable input variables have a sizable impact upon the educational output of educational systems. Non-controllable variables include the influence of the local community, of the Central Government, and of the State Government. All these influences have been divided into three categories: Human Resources, Economic Resources and the Decision-making process.

Human resources of the local community include the size of the community, educational level of the population, the kind and distribution of work skills among the population, and the

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[10] Swanson, Austin D. *The Cost-Quality Relationship.* A Paper presented at the Committee on Educational Finance of the National Education Association, April, 1967.

tradition of the community with respect to education.

[11]Mort encompassed the phenomenon within the terms "community" and "educational climate."

[12]James has recently described it as expectations. Even with great economic resources, a community will be handicapped in making adequate financial provisions for schools if its peope do not hold high expectations for their schools.

The nature of the inter-action function would be largely determined by qualities of the pupil input which is also highly correlated with the socio-economic level of the community.

Economic resources of the community fall into two categories, those which are accessible to taxation by the school board and those which are not accessible but which facilitate the payment of such taxes.

Perhaps, least is known about variables, Process for Decision Making.

Although the human and economic resources and decision making process are not subject to manipulation, the decision makers (school boards and administrators) must take these variables into account in making their decisions.

The controllable variables are of more interest to our immediate problem. They are factors about which we can do some-

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11. Mort, P.R. *School Community Relationships to School Quality*, Teachers' College Research Vol.55, No.4 (Jan.,1954).
12. H,T. James and Others. *Determinants of Educational Expenditures in Large Cities of the United States*, Cooperative Research Projects No.2389, Stanford, California: School of Education, Stanford University, 1966.

thing within the constraints of the non-controllable variables.

Research into the nature of cost-quality relationship has not advanced as dramatically as it has in business and industry. This is largely due to the differences in the nature of the variables of the two activities. A substantial portion of the variables of business and industry are easily quantifiable. In education, some inputs may be quantified, but the dominant input is people (children) of differing characteristics and without an assigned economic value. Similarly, educational output cannot be measured in terms of money but must be measured in terms of the institutional impact upon the behaviour of the persons who have been through the institutions. Thus an important aspect of research relevant to cost-quality analysis has been the development of units and scales.

The relationship between cost and quality studies were conducted by [13]Paul Mort and Francis Cornell in 1936 in the State of Pennsylvania. Subsequent to the findings of the Pennsylvania study, community situational sectors were controlled through a multi-variant technique known as the Sequential Simplex[14]. These series uncovered scores of factors related to the quality of the school process. These included fiscal factors such as net current expenditure per pupil, average

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13. Mort, P.R. and Cornell F.G. *American Schools in Transition* New York, Bureau of Publications, Teachers' College, Columbia University, 1941.
14. Mort P.R. and Furno O.F. *Theory and Synthesis of a Sequential Simplex*. New York; Institute of Administrative Research, Teachers' College, Columbia University, 1960.

teachers' salaries, professional to pupil ratio, small item expenditure per pupil, clerical per pupil ratio, professional specialist per pupil ratio, etc. These relationships were generally assumed to be linear with no discernible point of diminishing return.

The Mort studies also showed that more money did not purchase more of the same thing, but permitted development of new aspects of education. Although high expenditure schools generally do a better job of teaching, the basic schools the basic skills and in inter-relating areas of knowledge, they far excel their low expenditure counterpart in individualising inspection, in developing special talents of children, and in using teaching process designed to develop creativeness in children, ability to think critically, and ability to solve problems.

As a result of achievement tests given by the Armed Forces during World War II, some interesting discoveries of cost-quality relationship at the State level have been made.[15] Benjamin S. Bloom in 1955 used the Armed Forces General Educational Development Test as a criterion. He noted a marked variation in the general level of achievement by residents of the various States. There was a strong tendency for men educated in high expenditure States to achieve better. The correlation found between expenditure and achievement by Bloom was .75. A similar analysis was

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15. Bloom, B.S. *The 1955 Normative Study of the Tests of General Educational Development*. The School Review (March, 1956).

made by Ginzberg and Bray.[16] They noted that five out of seven rejectees during World War II came from the 12 lowest expenditure schools.

The [17]New York State Education Department has been conducting the quality measurement project for nearly a decade. The initial study, beginning in 1957, involved a sample of approximately 100 school districts in New York State. Quality was measured by using achievement test scores for 4 consecutive years. The affects of intelligence and socio-economic origin upon achievement were statistically neutralised. Seventy thousand students participated in the testing. A comparison was made between the 12 school districts which were almost universally good and the 12 districts which were almost universally poor. The good districts spent approximately 25 per cent more than the poor districts, which at that time amounted to $ 150 per pupil. The good quality districts put forth greater local effort than the poor quality districts. The median tax rate for the high quality districts was $ 14.90 per thousand dollars of full value compared to $ 11.73 in the low quality districts. The good districts hired about 5 more professionals per thousand students than did the poor quality districts. The salary schedules of the good districts were better than the poor districts although the average teachers

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[16] Ginzberg, E. and Bray, D.W. *The Uneducated*, New York, Columbia University Press, 1953.

[17] Firman, W.D. The Relationship of Cost to Quality in Education, *Long-Range Planning in School Finance*, Washington, National Education Association.

salaries were not higher. The teachers of the good quality districts were widely travelled, younger, better trained, and were recruited from a wider area.

[18]Project Talent conducted by the University of Pittsburgh and the American Institutes for Research found that achievement levels in schools are related to certain measures of fiscal inputs. Among these are (i) average teachers' salaries, (ii) teachers' experience, (iii) the size of the library, and (iv) the per-pupil expenditure.

[19]J. Alan Thomas, in an independent study using Project Talent data, analysed the relationship between selected inputs and the mean tests scores. Inputs included resources and home and community conditions. Using multiple regression techniques, he found that inputs of this nature do affect mean test scores.

A series of studies have been undertaken at the State University of New York at Buffalo whose purpose is to estimate the optimum allocation of financial in~~out~~put into schools assuming various degrees of financial constraint. These studies propose to accomplish the task by first analysing the relationships between components

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18. Flanagan J.C. and Others. *A Survey and Follow-up Study of Educational Plan and Decisions in Relation to Attitude Patterns*,: Studies of the American High School, Pittsburgh, University of Pittsburgh, 1962.

19. Thomas J.A. *Efficiency in Education*: A Study of the Relationship between Selected Inputs and Mean Test Scores in A Sample of Senior High Schools. An Unpublished Ph.D. Dissertation Completed at Stanford University, 1962.

of financial input to schools, inter-action variables, and a measure of output, school-affected pupil achievement, thereby establishing an empirical base for the generation of mathematical models of allocation of varying degrees of financial constraints. The results can serve as new guides for allocating school financial resources.

The models of financial allocation will be developed by multiple regression analysis, techniques, using school-affected pupil achievement as the dependent variable, and expenditures per unit for various categories of educational service as the independent variable. The measurement of school-affected achievement will be a school district median residual value, where a residual is computed for each pupil by substracting from his actual achievement score on a standardised test the achievement score predicted from his socio-economic rating. The independent variables will consist of sub categories of total discretionary expenditure per pupil for each school district in the sample.

The results of the study would have great significance for future fiscal planning of school districts in the following ways: (i) for the first time, empirically based guides for the allocation of school financial resources would be provided which are not grounded on the assumption of unlimited school district financial resources; and (ii) allocation decisions, presently made largely by subjective judgment, could be made more rationally. Application of the findings of this study should result in greater efficiency of school systems in their

use of financial resources.

[20]Mort summed up that the forces acting to produce school quality may be looked upon as a series of concentric spheres or as an onion with its layers of leaves. At the core is the criterion measuring school quality. The innermost sphere, having the most direct and immediate influence upon quality is "The School" itself with its staff of educators. The next sphere or level of remoteness from the product is "The School System Policy" including such considerations as salaries, numbers of staff, and adequacy of supplies. Moving another minute away from quality (in time but not in impact) is "The Educational Climate" as determined by the expenditure level and socio-economic factors in the community. The encompassing sphere is "The Community Characteristics," represented by such factors as wealth and certain socio-economic and physical considerations.

The review of the related literature showed that there is not a single significant variable but there are a number of variables operating upon school quality. The following variables have been identified:

1. The training and experience of teachers
2. Teachers salary
3. The pupil-teacher ratio
4. Adequate provision for text-books, Instructional supplies and libraries

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20. Mort P.R. and Furno, O.F. Theory and Synthesis of a Sequential Simplex. New York: Institute of Administrative Research, Teachers' College, Columbia University, 1960, p.13-14.

5. Better building equipment
6. Educational level of the population
7. Professional level of the parents of the children
8. Decisions taken by the school authorities
9. Length of the school period
10. Length of the school-term
11. Average days attended by the children of school age
12. Holding power of the school
13. Efforts put in by the teachers, students and the community.

CHAPTER V

METHODOLOGY AND PROCEDURE

The population consisted of Government Boys Higher Secondary Schools situated in the urban area of Southern part of Delhi constituted mostly by the families of Government employees. These schools are under the administration of the same body and provide more or less the same type of co-curricula-activities and follow the same curriculum. Twenty such schools were taken. The period of study was 1966-67. (List given in Annexure 1). All the twenty schools were teaching both science and non-science subjects.

Collection of Quality Data

For collection of marks obtained by the students of the schools under study during the year 1966-67, the Secretary of the Central Board of Secondary Education, New Delhi was contacted who allowed the Investigator to collect the relevant data.

In Delhi at the Higher Secondary Final Examination, while marking the papers, the fictitious roll numbers are assigned so that an outsider should not be able to approach the examiner for any undue favour. With the help of Board authorities, the original roll numbers of the required schools were ascertained and the total marks obtained by all the students passed as well as failed or those who got compartments were noted, and the former were divided by the latter for each school to obtain mean school achievement. The total, or part absentees and those students who used unfair means and whose results were withheld or cancelled were excluded.

The Instrument For Collection of Correlates Data

For Collection of Correlates data, a schedule was designed which was personally administered by the investigator in schools under study. The schedule is given at Appendix III. The officer-incharge of each school was contacted and the investigator did not find much difficulty in completing the schedule barring a few institutions where the principals of the schools concerned were persuaded to let the investigator examine the relevant school records at the intervention of the Directorate of Education.

The first correlate hypothesised was the qualifications of teachers. Weights were given to I, II, III class beginning from B.A./B.Sc./B.Com. onward as given in Table I.

Table I

Weights to Qualifications

Class	Weights to Qualifications		
	B.A./B.Sc./ B.Com.	B.T./B.Ed./ L.T./S.A.V.	M.A./M.Sc./ M.Ed.
I	10	12	15
II	7	9	12
III	5	7	10

Qualifications of only post-graduate teachers were taken into account. The total marks assigned to the qualifications of each teacher were added in each school and the mean qualifications of the teachers of each school were taken by dividing the total score by the number of teachers.

The second correlate hypothesised was the experience of teachers of schools under study. Each teacher was alloted one mark for one year experience. The number of years put in the teaching profession bring to a teacher the same number of marks. The total number of marks of all the teachers including the Principal of the school were added and the grand total was divided by the number of teachers which give the mean teaching experience of each school.

The third correlate hypothesised was the salaries of the teachers. The mean salary of teacher of a school was calculated by adding the salaries of all the teachers including principal and dividing it by the total number of teachers.

The fourth correlate hypothesised was the teacher-pupil ratio. The total number of students in a school were taken into consideration. Similarly the total number of teachers in a school were counted. The total number of students were divided by a total number of teachers which gives the teacher-pupil ratio in each school.

The fifth correlate hypothesised was the size of school which denotes the number of students in each school.

The The sixth correlate hypothesised was the depreciation cost of school buildings. This was assumed equivalent to the rental value of the building in which the school was housed. The imputed rental value of school buildings under study were calculated with the help of C.P.W.D. official. The school buildings were categorised into three viz. R.C.C. building, Barracks building and Tented building. The total area of school building was taken into consideration and the rental values were assigned according to the size,

site and material used in the building.

The last (seventh) correlate hypothesised was the value of science laboratory equipment of each school.

Subsequent to quantifying the criterion (i.e. quality) and prediction (i.e. correlates) variables, Pearson's Product-Moment Coefficient of Correlations were calculated. The results obtained are presented in the following Chapter.

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CHAPTER VI

ANALYSIS AND INTERPRETATION

As stated in the preceding Chapter, mean school achievement was chosen as an indicator of quality. Mean school achievement scores of the twenty schools including in the study are presented in the Table II.

Table II

Mean School Achievement of Twenty Schools (1966-67)

S.No. of Schools	Mean School Achievement
1.	387
2.	381
3.	363
4.	412
5.	383
6.	406
7.	404
8.	401
9.	370
10.	367
11.	391
12.	389
13.	402
14.	418
15.	401
16.	360
17.	323
18.	371
19.	360
	354

The first correlate hypothesised was the qualifications of teachers. The mean score of the qualifications of teachers are presented in the Table III for each of the twenty schools.

Table III

Mean Qualifications of Teachers of Twenty Schools (1966-67)

S.No. of Schools	Mean Qualifications of Teachers
1.	23.0
2.	21.0
3.	24.0
4.	23.0
5.	24.0
6.	24.0
7.	23.0
8.	23.5
9.	22.5
10.	23.0
11.	22.0
12.	24.7
13.	22.0
14.	21.5
15.	22.5
16.	22.0
17.	24.0
18.	24.0
19.	23.0
20.	23.0

The second correlate hypothesised was the experience of teachers. The mean experience of teachers per school is tabulated below.

Table IV

Mean Experience of Teachers of Twenty Schools (1966-67)

S.No. of Schools	Mean Experience of Teachers
1.	10.5
2.	9.5
3.	8.2
4.	9.0
5.	8.0
6.	9.0
7.	10.5
8.	8.0
9.	9.5
10.	13.0
11.	9.0
12.	8.5
13.	9.0
14.	10.0
15.	9.0
16.	10.5
17.	12.5
18.	10.0
19.	13.5
20.	9.0

7.	542
8.	529
9.	527
10.	526
11.	532
12.	531
13.	517
14.	532
15.	524
16.	541
17.	547
18.	560
19.	555
20.	532

The third correlate hypothesised was the salaries of teachers. The mean salary of the teachers per school is tabulated below.

Table V

Mean Salary of Teachers of Twenty Schools (1966-67)

S.No. of Schools	Mean Salary of Teachers
1.	506
2.	535
3.	535
4.	534
5.	541
6.	545

The fourth correlate hypothesised was the teacher-pupil ratio. The teacher-pupil ratios are presented below for each of the twenty schools.

Table VI

Teacher-Pupil Ratio of Twenty Schools (1966-67)

S.No. of Schools	Teacher-Pupil Ratio
1.	21.0
2.	24.0
3.	24.0
4.	22.0
5.	21.0
6.	23.5
7.	23.0
8.	23.5
9.	22.5
10.	23.0
11.	22.0
12.	24.7
13.	22.0
14.	21.5
15.	22.5
16.	22.0
17.	24.0
18.	24.0
19.	23.0
20.	23.0

The fifth correlate hypothesised was the size of the school which is given below for each of the twenty schools.

Table VII

Size of Twenty Schools (1966-67)

S.No. of Schools	No. of Students
1.	583
2.	711
3.	699
4.	533
5.	475
6.	726
7.	713
8.	705
9.	526
10.	711
11.	510
12.	1000
13.	785
14.	714
15.	838
16.	709
17.	404
18.	571
19.	482
20.	507

The sixth correlate hypothesised was the depreciation cost of the school buildings and its assumed equivalent rental value is presented below for each of the twenty schools.

Table VIII

Imputed Rental Value of Twenty Schools (1966-67)

S.No. of Schools	Rental Value (1966-67) Rs.
1.	12,000
2.	5,000
3.	4,500
4,	8,000
5.	7,000
6.	13,000
7.	4,500
8.	8,000
9.	12,000
10.	5,000
11.	4,000
12.	10,000
13.	8,000
14.	9,000
15.	12,000
16.	4,800
17.	3,000
18.	6,000
19.	3,000
	10,000

The seventh correlate hypothesised was the value of the science laboratory equipment which is tabulated below.

Table IX

Value of Science Laboratory Equipment of Twenty Schools (1966-67)

S.No. of Schools	Value of Science Laboratory Equipment Rs.
1.	10,000
2.	6,000
3.	5,500
4.	9,600
5.	9,200
6.	7,075
7.	7,000
8.	6,500
9.	4,600
10.	5,900
11.	5,600
12.	7,050
13.	7,000
14.	6,500
15.	10,000
16.	9,000
17.	5,000
18.	7,000
19.	7,000
20.	6,500

Pearson's Product Moment Coefficients of Correlations were calculated between quality as dependent and the seven correlates as independent variables. The correlations obtained are tabulated below:

Table X

Correlation between the Index of Quality of Education (mean school achievement) and the seven Independent Variables

Independent Variables	Coefficient of Correlation	Degree of Freedom (df)	Remarks
1. Teachers Qualifications	-.21	18	Not significant
2. Teachers Experience	.02	18	Not significant
3. Teachers Salaries	.43	18	Not significant
4. Size of School	.49	18	Significant at .05 level only
5. T.P. Ratio	.62	18	Significant both at .05 and .01 level.
6. Rental Value of the School Building	.34	18	Not significant
7. Science Laboratory Equipment	-.30	18	Not significant

From the above table, it can be inferred that the Null hypotheses No 2,3,4,7 & 8 stated in Chapter II that there are no correlations between teachers qualifications, teachers experience, teachers salaries, rental value of the school buildings and science laboratory equipment respectively and quality of education are accepted. On the other hand, Null hypothesis No.4 stating that there is no correlation between size of school and quality of education is rejected, since there is relationship among these variables which is significant at

.05 level. The Null hypothesis No.5 which states that there is no correlation between teacher-pupil ratio and quality of education is also rejected because there is a relationship among these variables significant at both .05 and .01 level.

Regression Equations

In case of significant correlates viz. the size of the school and the teacher-pupil ratio, the regression equations were worked out as:

(I) Regression Equations ___ Size of School and Quality of Education

(a) $$\bar{Y} = r \frac{\sigma Y}{\sigma x} . x$$

When $r = .49$
$\sigma Y = 28.47$
$\sigma x = 4.72$

$$\bar{Y} = 2.95\, x$$

(b) $$\bar{x} = r . \frac{\sigma x}{\sigma y} . y$$

$$\bar{x} = .08\, y$$

(II) Regression Equations ___ Teacher-pupil ratio and Quality of Education.

(a) $$\bar{y} = r \frac{\sigma y}{\sigma x} . x$$

When $r = .62$
$\sigma y = 68.6$
$\sigma x = 472$

$$\bar{y} = .09\, x$$

(b) $$\bar{x} = r \frac{\sigma x}{\sigma y} . y$$

$$\bar{x} = 4.2\, y$$

These regression equations make it obvious that the relations of the said two variables viz. size of the school and teacher-pupil ratio with quality of education are linear.

Multiple Regression Model

The coefficient of Multiple correlation was worked out between the quality of education (dependent variable) and the size of the school and the teacher-pupil ratio (independent variables

The data worked out is given as:

(1) Mean School Achievement	(2) Mean T.P. Ratio	(3) Mean Size of the School (No. of students)
$M_1 = 381.6$	$M_2 = 22.9$	$M_3 = 645.2$
$\sigma_1 = 23.6$	$\sigma_2 = 3.4$	$\sigma_3 = 142.4$
$r_{12} = .62$	$r_{13} = .49$	$r_{23} = .18$

The Partial correlations worked out were:

$$r_{12.3} = \frac{r_{12} - r_{13}\,r_{23}}{\sqrt{1 - r_{13}^2}\,\sqrt{1 - r_{23}^2}} = .62$$

$$r_{13.2} = \frac{r_{13} - r_{12}\,r_{23}}{\sqrt{1 - r_{12}^2}\,\sqrt{1 - r_{23}^2}} = .49$$

The Partial σ's were:

$$\sigma_{1.23} = \sigma_1 \sqrt{1 - r_{12}^2}\,\sqrt{1 - r_{13.2}^2} = 16.118$$

$$\sigma_{2.13} = \sigma_2 \sqrt{1 - r_{23}^2}\,\sqrt{1 - r_{12.3}^2} = 2.621$$

$$\sigma_{3.12} = \sigma_3 \sqrt{1 - r_{23}^2}\,\sqrt{1 - r_{13.2}^2} = 121.922$$

The Partial Regression Coefficients Computed were:

$$b_{12.3} = r_{12.3}\,\frac{\sigma_{1.23}}{\sigma_{2.13}} = 3.81$$

$$b_{13.2} = r_{13.2}\,\frac{\sigma_{1.23}}{\sigma_{3.12}} = .065$$

The Regression Equation obtained was:

$$\bar{x}_1 = b_{12.3}\, x_2 + b_{13.2}\, x_3 \quad \text{(deviation form)}$$
$$= 3.81\, x_2 + .065\, x_3$$

$$\bar{X}_1 = b_{12.3}\, X_2 + b_{13.2}\, X_3 + K \quad \text{(Score form)}$$
$$= 3.81\, X_2 + .065\, X_3 + K$$

From the above equation if we know the school size and T.P. Ratio, we can predict this school mean achievement. This when correlated with actual achievement give the cofficient of multiple correlation.

Coefficient of Multiple Correlation computed was:

$$R_1\,(23) = \sqrt{1 - \frac{\sigma^2_{1.23}}{\sigma^2_1}} = .73$$

Thus the prediction of quality index (Mean School achievement) is significant at .01 level for 18 d.f. with the combined action of independent variables - size of the school and T.P. Ratio.

Conclusions:

The results of correlations indicate that in case of two independent variables viz. the size of school and the T.P. Ratio, the quality index (mean school achievement) can be predicted effectively. The other independent variables studied in the present investigation viz. qualifications, experience, salary of teachers and depreciation cost of the school building and value of science laboratory equipment do not contribute significantly towards the quality criterion. It may therefore be hypothesised that quality-index may be due to some other variables such as

the ability of the students, better-socio-economic conditions in case of some students, better administration of some institutions, and better motivation of teachers and taught in some schools as compared to others. Further research in this direction can be taken with profit.

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C H A P T E R VII

SUMMARY OF THE FINDINGS

The major objective of the study was to identify the correlates of the quality of education. It is ascertained that unless these correlates are identified, effective steps cannot possibly be taken to improve the quality of education. The main hurdle of quality study on the correlates is to define the criterion of the school quality. The school quality index in the present investigation is conceptualized as the Mean school achievement as revealed by the pupils' scholastic achievement in the school final examination, 1966-67, conducted by the Central Board of Secondary Education. Twenty Government Boys Higher Secondary Schools situated in the Southern part of Delhi were taken for study. The seven independent variables affecting the quality of education were taken into account. These were teachers' qualifications, experience, salaries; size of the school, teacher-pupil ratio, depreciation cost of the school building and the value of the science laboratory equipment. A schedule for collection of data was prepared and administered in the twenty schools under study.

(Pearson's Product Moment Coefficients) of Correlations were calculated between quality as dependent and the seven correlates as independent variables. In respect of only two independent variables viz. the size of the school and the T.P. ratio, the correlations with the quality of education were found to be .49 and .62 respectively which are significant at .05 level in case of former and even at .01 level in case of latter.

Regression equations were fitted, which make the linearity of the relationships obvious. The Coefficient of Multiple Correlation which was .73, further substantiated the significance of these two independent variables contributing towards the quality of education.

The present study highlights the significance of the size of the school and the T/P. ratio which go a long way to determine the qualitative aspect of education. These are however not the only variables which are highly correlated with the quality of school education. There may be several other variables which may be related but which have not been examined in the present study. The independent variables such as the innate ability of the student, socio-economic conditions of the locality in which the school is situated, administration of the institutions, motivation of the teachers and taught etc. are several other variables which can be hypothesised as correlates of quality of education in future investigations.

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ANNEXTURE I

of Twenty Schools Studied

Government Boys Higher Secondary School, Andrew's Ganj, New Delhi.

Government Boys Higher Secondary School, Kalkaji (1) New Delhi.

Government Boys Higher Secondary School, Kalkaji (2) New Delhi.

Government Boys Higher Secondary School, Kidwai Nagar, (1) New Delhi.

Government Boys Higher Secondary School, Kidwai Nagar (2) New Delhi.

Government Boys Higher Secondary School, Laxmibai Nagar, New Delhi.

Government Boys Higher Secondary School, Lajpat Nagar (1) New Delhi.

Government Boys Higher Secondary School, Lajpat Nagar (2) New Delhi.

Government Boys Higher Secondary School, Moti Bagh (1) New Delhi.

Government Boys Higher Secondary School, Moti Bagh (2) New Delhi.

Government Boys Higher Secondary School, Netaji Nagar, New Delhi.

Government Boys Higher Secondary School, Sarojini Nagar, (1) New Delhi.

Government Boys Higher Secondary School, Sarojini Nagar (2) New Delhi.

Government Boys Higher Secondary School, Sarojini Nagar (3) New Delhi.

Government Boys Higher Secondary School, Sarojini Nagar (4) New Delhi.

Government Boys Higher Secondary School, Sarojini Nagar (5) New Delhi.

Government Boys Higher Secondary School, Chirag Delhi, New Delhi.

Government Boys Higher Secondary School, Malviya Nagar, New Delhi.

Government Boys Higher Secondary School, Meharauli (2) New Delhi.

Government Boys Higher Secondary School, R.K. Puram, New Delhi.

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ANNEXURE III

Questionnaire Devised to Collect Information About School Expenditure during the School Year 1966-67.

Part I

(1) Name of the School ____________________

(2) Address ____________________

(3) Number of pupils

(4) Number of Classes

(5) Number of Teachers

(6) Non-teaching Staff:

(a) Administrative:

(b) Peon, Waterman, Frash etc.

(7) Date of construction of the school building:

(8) Covered Space:

(9) Building Costs (Excluding cost of the plot).

(10) Cost of the initial equipment:

(11) Qualifications of Teachers and ~~technical~~ teaching experience
(B.A./B.Sc./B.Com. onward) S. N. Qualifications

S.No.	Qualifications	Division	Experience